GORGAS MEMORIAL LABORATORY

OF MICHIGAN
SEP 2 3 1959
MAIN READING ROOM

HEARING

BEFORE THE

SUBCOMMITTEE ON INTER-AMERICAN AFFAIRS

OF THE

COMMITTEE ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES

EIGHTY-SIXTH CONGRESS

FIRST SESSION

ON

S. 2219, H.R. 8016, and H.R. 8102

TO AUTHORIZE APPROPRIATIONS FOR CONSTRUCTION OF FACILITIES FOR THE GORGAS MEMORIAL LABORATORY, TO INCREASE THE AUTHORIZATION OF APPROPRIATIONS FOR THE SUPPORT THEREOF, AND FOR OTHER PURPOSES

AUGUST 28, 1959

Printed for the use of the Committee on Foreign Affairs

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CONTENTS

LIST OF WITNESSES

Page

Friday, August 28, 1959:

Bloedorn, Dr. Walter A., president, Gorgas Memorial Institute of Tropical and Preventive Medicine, Inc. 4

Roberts, Hon. Kenneth A., a Representative in Congress from the State of Alabama 1

Thatcher, Hon. Maurice H., vice president and general counsel, Gorgas Memorial Institute of Tropical and Preventive Medicine, Inc. 2

Wright, Dr. Willard H., professional associate, National Academy of Sciences-National Research Council 8

APPENDIX

Letter, August 28, 1959, from Dr. Walter A. Bloedorn to Hon. Armistead I. Selden, Jr., enclosing proposed application of additional funds requested under S. 2219 11

"Gorgas Memorial Laboratory," statement prepared by Gorgas Memorial Institute, and submitted by Hon. Kenneth A. Roberts 12

GORGAS MEMORIAL LABORATORY

FRIDAY, AUGUST 28, 1959

HOUSE OF REPRESENTATIVES,
COMMITTEE ON FOREIGN AFFAIRS,
SUBCOMMITTEE ON INTER-AMERICAN AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to call, at 10:30 a.m., in room G–3, the Capitol, Hon. Armistead I. Selden, Jr. (chairman of the subcommittee) presiding.

Mr. SELDEN. The subcommittee will come to order.

We have with us this morning the Honorable Kenneth A. Roberts, a Member of Congress from Alabama's Fourth District. He is accompanied by Gov. Maurice H. Thatcher, Dr. Walter A. Bloedorn, and Dr. Willard H. Wright.

We are very pleased to have our colleague from Alabama, Congressman Roberts, with us today. He is appearing in support of S. 2219 and a similar measure, H.R. 8016, which he introduced. Mr. Fulton has also introduced an identical bill, H.R. 8102.

(S. 2219 follows:)

[S. 2219, 86th Cong., 1st sess.]

AN ACT To authorize appropriations for construction of facilities for the Gorgas Memorial Laboratory, to increase the authorization of appropriations for the support thereof, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, effective for fiscal years ending after June 30, 1960, section 1 of the Act of May 7, 1928 (22 U.S.C. 278), relating to the authorization of annual appropriations for maintenance and operation of the Gorgas Memorial Laboratory, is amended by striking out "$150,000" and inserting in lieu thereof "250,000".

SEC. 2. Such Act is further amended by adding at the end thereof the following new section:

"SEC. 4. There are hereby authorized to be appropriated [from time to time such sums as the Congress may find necessary] *not to exceed $250,000* for construction and equipment of facilities for the Gorgas Memorial Laboratory, including preparation of plans and specifications, acquisition, alteration, expansion, and remodeling of buildings, and site improvements; but excluding the cost of the acquisition of land."

Passed the Senate August 19 (legislative day, August 18), 1959.

Attest: FELTON M. JOHNSTON, *Secretary.*

Mr. SELDEN. The Chair recognizes Congressman Roberts.

STATEMENT OF HON. KENNETH A. ROBERTS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ALABAMA

Mr. ROBERTS. Mr. Chairman and members of the committee, I appear here today in favor of S. 2219, a bill which was introduced by Alabama's senior Senator, Lister Hill, which seeks to provide an additional $100,000 for maintenance and operation of the Gorgas

Memorial Laboratory in the Republic of Panama, Panama City, and also to provide an authorization for equipment and facilities as set forth in section 4 of the bill.

General Gorgas' work in eradicating and controlling yellow fever and malaria undoubtedly led to the successful building of the canal by this Government whereas other governments had failed in this great undertaking. General Gorgas also was Surgeon General of the U.S. Army and introduced the idea of medical examinations for all men in the service and all men being drafted, and this idea has continued until today it extends to all people in the civil service.

Another great Alabamian, the late great Senator Morgan of Alabama, was a firm believer in and advocate of the Canal Zone, but preferred the Nicaraguan route.

I believe it would be hard to find a more worthy undertaking, and I would prefer at this point to introduce the gentlemen with me, who will make statements in behalf of this bill.

The Honorable Maurice H. Thatcher, former Congressman and former Governor of the Panama Canal Zone, Dr. Walter Bloedorn, President of the Gorgas Memorial Institute, and Dr. Willard Wright, member of the Board of Directors of the Institute, formerly a member of the U.S. Public Health Service, now retired.

STATEMENT OF HON. MAURICE H. THATCHER, VICE PRESIDENT AND GENERAL COUNSEL, GORGAS MEMORIAL INSTITUTE OF TROPICAL AND PREVENTIVE MEDICINE, INC.

Governor THATCHER. Mr. Chairman, we are very grateful for the opportunity of presenting the reasons for the proposed legislation embodied in Senate bill 2219 introduced by Senator Hill, H.R. 8016 by Mr. Roberts, and H.R. 8102 by Mr. Fulton of this committee.

S. 2219 has passed the Senate and probably will be used by the committee for consideration and action as being the simplest method of procedure in the premises.

As you perhaps know, in Congress I was the author of the original act which was passed by the Congress in 1928 and became law. We had a hearing before this committee on that bill which was, in my judgment, one of the most dramatic hearings ever conducted by a committee of the Congress. A reading of the hearings on the original act I believe will justify this statement.

I happen to be the only surviving member of the Isthmian Canal Commission which had charge of the building of the canal, and I served on the Commission with General Gorgas, who was the great sanitarian and yellow fever expert, whose work was indispensably a prerequisite to the success of the canal enterprise.

We had our offices in the same building and were close friends. Everything that affected the canal passed through my hands for presentation to the Republic of Panama where Panama itself was concerned. Health and sanitation requests made by General Gorgas came through my hands, and I may say they were always granted by the Panamanian Government, which was most cooperative concerning all health and sanitary matters in which Panamanian areas were concerned.

The Gorgas Memorial Institute of Tropical and Preventive Medicine, Inc., is a corporation, nonprofit in character and dedicated to

public health activities, organized under the laws of Delaware. The Institute has more flexibility than the United States in dealing with this question of property in Panama and the work of the laboratory, and it took title from the Panamanian Government for the laboratory property in Panama with a building on the ground which had been erected by Panama as a medical school, but which came to the ownership of the Institute, and in which the laboratory was housed, and since then its activities have been conducted there. As long as the property is used for purposes of the Gorgas Memorial Laboratory, the title is in fee simple to the Institute, and will continue to be in perpetuity unless the use of the laboratory should be entirely abandoned, in which case the property would revert to Panama. The Institute operates the laboratory, and has no other activity.

The property has become quite valuable because of the growth of the city of Panama, and is today worth several hundred thousand dollars. It was conveyed to the Institute for these laboratory purposes as a gift from Panama.

We have added some smaller structures through the years to the main building, but we need other structures and ample ground remains on which they may be constructed. Additional equipment is also greatly needed.

This organization has done great work in Panama. In World War II its work was reflected in the sanitary milk work in the Pacific and wherever we went. The Gorgas Memorial Laboratory is known for its work all over the world. It is getting to be the greatest institution of its kind in all the tropics.

We need this money for expansion and for additional buildings and equipment. The original building was for the school of medicine that Panama had established, and then they deeded it to us, and that is the principal building, which I will show you in this publication [exhibiting the book containing the hearings and proceedings on the basic act]. The $150,000 has been the ceiling. That is the main building [indicating].

Mr. ROBERTS. Please explain our situation with respect to the utilization of the rest of this property, also.

Governor THATCHER. If we do not use the unimproved portion of the land there might be a question on the part of Panama that it ought to revert for nonuse. Of course, we do use it in a general way, but then we can put these much-needed improvements there and save any question of that sort. We have title to the whole lot. It has gotten to be a very valuable piece of property, worth several hundred thousand dollars today, I am sure.

The Santo Tomas Hospital is there, and the Panama Hospital, which is a private institution but well known, is right there in the same vicinity. There are some very valuable pieces of property there, and we are in the heart of it.

Some additional structures are needed, and they can go right on this property, and there would be no cost for site. The bill provides that no money shall be expended for the site.

I drew a bill some years ago to increase the ceiling and got Senator Hill to introduce it, and then we got it passed and increased the ceiling to $150,000. We need all that and more for the adequate functioning of the work.

I have said before, and I say again, that I believe that in all of the expenditures of the Government of the United States, no dollar is more wisely and beneficently expended than that which is expended for this work in Panama.

Mr. ROBERTS. You consider this is a popular activity with the people of Panama?

Governor THATCHER. It is very popular.

On this particular venture, they have always been friendly, they have always been cooperative, and they have always been proud of what is being done there. We have men like Dr. Galindo there, who is a very capable man, a Panamanian, and we have certain help there which is Panamanian. Dr. Clark always got along with the Panamanian people and Government; he was Director for years, a very capable man, retired now, and Dr. Johnson, who is now in the same role as Director, is on friendly and cooperative terms with the Panamanian Government.

Of all the activities on the isthmus with which we have anything to do, I do not believe there is any one which is as popular in Panama with the people and the Government as the Gorgas Memorial Laboratory. It is doing a great work there, and we need to expand the activities. The policy has always been to cooperate with other scientific institutions, but to avoid duplication of work.

Dr. Bloedorn can tell you more in detail as to what is desired in these respects.

The authorization of the bill is general in character about buildings and improvements. If and when that becames a law, instead of going to a legislative committee for improvement and equipment needs, we can ask for appropriations. We can go to the Appropriations Committee direct under this basic authorization, but we have to make our justification just the same. It is correct, of course, that we should make it. That is the situation.

Dr. Bloedorn can go into detail of how the money is to be expended. It ought to be passed so we can make our plans for the future, because we must get the plans in shape, and we must go before the committees and say this is what we reasonably need and make our justification.

Mr. SELDEN. Thank you, Governor Thatcher.

Dr. Bloedorn, we shall be very happy to hear you.

STATEMENT OF WALTER A. BLOEDORN, M.D., PRESIDENT, GORGAS MEMORIAL INSTITUTE OF TROPICAL AND PREVENTIVE MEDICINE, INC.

Dr. BLOEDORN. Congressman Selden, I have a prepared statement which is not long. May I read that?

Mr. SELDEN. You certainly may.

Dr. BLOEDORN. I am Dr. Walter A. Bloedorn, formerly dean of the School of Medicine of George Washington University and the medical director of the George Washington University Hospital. Since 1957 I have been president of the Gorgas Memorial Institute of Tropical and Preventive Medicine, and am appearing before you in that capacity.

S. 2219 and the House bill, H.R. 8016, which are identical bills, would (1) authorize an annual appropriation up to $250,000 for support of the Gorgas Memorial Institute, as compared with the present

authorization of $150,000, and (2) authorize appropriations for construction and equipment of facilities.

The Gorgas Memorial Institute was named for a great general who made it possible to build the Panama Canal by the conquest of yellow fever and malaria. It was created in 1928 when legislation was passed permitting an annual authorization for the support of the Institute. In 1930, Panama ceded in perpetuity to the Gorgas Memorial Institute a parcel of land and a building constructed thereon originally intended to serve as a medical school. The plot of land comprises an entire city block which today is valued at over a quarter of a million dollars. The building was converted to a laboratory by the installation of utilities and equipment appropriate for research use. In its early years, there were only a few professional employees of the Laboratory so that the building itself could house animal quarters, insectaries, and laboratory space for visiting investigators.

During the last decade, increases in size of the professional staff were made possible by constructing a temporary building for the housing of laboratory animals and an insectary for rearing vectors and, unfortunately, by restricting the number of visiting scientists using the facilities.

ORGANIZATION

The Gorgas Memorial Institute is incorporated under the laws of the State of Delaware and is governed by a Board of Directors which includes the Ambassador of Panama, the Surgeons General of the Army, Navy, Air Force, and Public Health Service, presidents of selected professional organizations, and a group of elected directors. The Board of Directors meets annually and determines the policies of the Institute. The officers serve without compensation. The Gorgas Memorial Laboratory is the operating arm of the Institute and its entire staff is located in Panama. A Scientific Advisory Board assists in developing the research programs.

PERSONNEL

The Laboratory employs nine professional personnel, most of whom enjoy international scientific reputations. The Laboratory has been fortunate in the low turnover rate of its scientists which has provided a unique stability permitting long-term investigations. Until a few years ago, salaries were far below those of comparable research positions elsewhere with no provision for retirement. The Board of Directors at its annual meeting in 1954 approved a pay schedule more commensurate with that of comparable research workers in the United States and approved a contributory retirement plan. These actions are providing an even greater degree of stability than that of the past.

In my opinion, the staff is not only highly competent and well qualified, but has an eminence unexcelled anywhere in a small research laboratory. With such a staff, we can predict a continued output of highly significant research findings.

FINANCE

The major portion of the financial support of the Institute is appropriated by the Congress, but some funds are received from contracts

with nongovernmental organizations (United Fruit Co.). Research funds available under the Gorgas authorization are augmented by research grants from the National Institutes of Health.

FUNCTIONS

The Laboratory was created to serve both the United States and Panama in research on those diseases which require a base of operations in a tropical area. The results are reported to the Congress annually. A perusal of these reports amply demonstrates the high quality of the work being performed. However, annual reporting may not give a proper perspective to the value and importance of the work. To illustrate, I will discuss research on two of the diseases—malaria and yellow fever—which have received the attention of the Laboratory.

Early work in the Laboratory consisted of evaluating a new German synthetic chemical—atabrine—against the malaria. Until 1930, quinine was the only available drug against this disease.

The Director of the Laboratory at that time, Dr. Herbert Clark, surveyed the malaria incidence among natives in Chagres River villages and then divided the villages into groups, treating some with quinine and some with atabrine. During the next decade, Dr. Clark obtained information on the value and limitations of atabrine as both a prophylactic and treatment agent against malaria.

This work took on an unanticipated importance in World War II, when U.S. imports of quinine were stopped and it became necessary to use another drug to supplement the diminishing supply of quinine to protect U.S. troops fighting in the South Pacific. During the early years of World War II, the United States therefore was forced to substitute atabrine for quinine, a substitution made possible by the investigations of Gorgas Memorial Laboratory.

In 1948, yellow fever reappeared in Panama for the first time since 1905. In succeeding years, the yellow fever virus moved northward through the isthmus, up Central America, progressing at an average rate of 13 miles a month. This extension of yellow fever resulted from infections in monkeys transmitted by treetop mosquitoes with man as an incidental host. The Laboratory collected and identified mosquitoes transmitting the disease and studied their ecology. It also studied the mammalian hosts of the infection. These findings contributed greatly to the factual knowledge available today for prognosticating the movements of jungle yellow fever and for the scientific basis upon which it is hoped procedures can be developed. Much more needs to be done because there is epidemiological evidence that a mammal other than monkeys can serve as a reservoir of the virus, and mosquitoes presently not incriminated can transmit the disease, and because the mechanics of survival of the virus during climatically unfavorable periods are unknown.

While the major mission of the Laboratory is in the field of medical research, it also performs valuable service functions. It has, since its creation, been host to visiting medical scientists from the United States whose research endeavors carried them into the tropics. Generally one, two, or even three such scientists are provided with Laboratory facilities for limited periods. The Laboratory also serves as a training station for U.S. physicians interested in tropical medicine who have

traveling fellowships. Fellowships administered by the dean of LSU Medical School have included time spent in the Laboratory and on field trips under the direction of members of the regular staff. The Laboratory also serves as a diagnostic reference center for special examinations not otherwise available to the Panamanian authorities. Because of the competence of the staff, they are sometimes detailed to U.S. agencies for investigations of little known diseases. Such was the case when a senior staff member was loaned to the Army to investigate outbreaks of acute hemorrhagic fever in Korea.

RELATIONS WITH THE GOVERNMENT OF PANAMA

One of the most unique features of the Laboratory is the relations with other governments and agencies. It has been repeatedly reported that the Panamanian Government takes a great deal of pride in the work and accomplishments of the Laboratory. Through the Republic of Panama and its association with the Laboratory, personnel are given ready access to the countries of Central America, making it possible for them to follow their epidemiological investigations across national frontiers without the delays ordinarily experienced in international research.

RELATIONS WITH OTHER AGENCIES

The Laboratory collaborates very closely with the Pan American Health Organization which has need for expert talent and specialized laboratory facilities to carry on its control and eradication programs of Central America. Experts from both organizations frequently accompany one another on field expeditions, each contributing in his area of proficiency.

The new Middle America Research Unit of the National Institutes of Health, located in the Canal Zone, and the Gorgas Laboratory are carrying on cooperative studies made possible by the special resources available to each institution.

During 1958, Laboratory facilities were made available to research scientists from the U.S. National Museum, the University of Pennsylvania, Universidad Central de Venezuela, and the World Health Organization.

Consultant services are provided to various tropical industrial organizations, particularly the United Fruit Co.

The availability of NIH grants to the Laboratory makes it possible to carry on basic research on problems dealing with exotic diseases. The approval of such grants is subject to the same painstaking scrutiny as are other NIH grants but the number of grants that the Institute can request is limited by the physical facilities available and by the time that can be committed by the permanent staff. In this connection, I would like to point out that the funds available from Congress for development of medical research facilities in the United States under the Health Research Facilities Act are not available to the Gorgas Institute because of its geographic location outside the United States.

FUTURE OF THE INSTITUTE

It is obvious that with the increased rapidity and amount of international travel, the medical problems of Central America become

more important to the United States. The new Pan American Highway provides a new artery for traffic between the United States and Panama but also provides a new channel for the transmission of tropical diseases. Every military emergency that this country has faced has shown us that we know too little of the diseases not ordinarily occurring in this country which in both World Wars and the Korean conflict led to unnecessary death and disability. These needs, along with the importance the Panamanians attach to this joint endeavor, point to the need for expansion of the Laboratory which can be expected to continue to pay dividends far beyond the amount invested. The joint endeavor of the United States and the Republic of Panama in medical research is an example of international cooperation of the highest quality.

With these considerations in mind, the Board of Directors of the Institute believe that the time has come when the annual operating authorization should be increased to $250,000 and when plans should be formulated for the expanding of physical plant to provide the space necessary for the Laboratory employees and for housing visiting investigators and fellows. The Board therefore hopes that you will give your full support to S. 2219.

Mr. SELDEN. Thank you, Doctor, for a very fine statement.

Congressman Fascell, do you have any questions?

Mr. FASCELL. No questions.

Governor THATCHER. Mr. Chairman, Dr. Wright is here.

Mr. SELDEN. Dr. Wright, would you like to add anything to the fine statement which has been made by Dr. Bloedorn?

Dr. WRIGHT. Is there time, Mr. Chairman?

Mr. SELDEN. Yes; you can have all the time you like.

STATEMENT OF DR. WILLARD H. WRIGHT, PROFESSIONAL ASSOCIATE, NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL.

Dr. WRIGHT. Mr. Chairman, my name is Dr. Willard H. Wright. I am now a professional associate of the National Academy of Sciences-National Research Council.

Prior to my retirement from the Public Health Service about a year ago, for 20 years I was Chief of the Laboratory of Tropical Diseases of the National Institutes of Health and, consequently, I am very familiar with the Gorgas Memorial Laboratory. I have been in the Laboratory many times in the past. I worked with Dr. Clark when he was Director of the Laboratory.

Dr. Bloedorn mentioned the Middle America Research Unit of the National Institutes of Health. This was organized under my supervision and one of the reasons why the Laboratory was placed in the Canal Zone concerned the cooperation which could be obtained from a long-established laboratory such as the Gorgas Memorial Laboratory in the Republic of Panama.

I should like to just say a word about the urgency of the new facility for the research of the Gorgas Laboratory.

As Governor Thatcher has mentioned, the building was built for a medical school and not for a research laboratory. Actually, a considerable part—an inordinate proportion, as a matter of fact—of the

physical facilities is concerned with an auditorium which is almost useless for laboratory purposes, and the only use it has is for monthly gatherings of the Panamanian Medical Association. The space is extremely crowded and at the present time Dr. Johnson, the Director of the Laboratory, is expanding and wishes to provide for more research on virus diseases which are becoming of greater importance all the time in the tropics, particularly the so-called arbor viruses which are mostly mosquitoborne. A year ago there was said to be 77 of these viruses. In the last year several new ones have been recognized, showing the importance of this kind of investigation. During the past 5 years over 50 new arbor viruses have been discovered.

The facilities in the present building are not adequate to carry on any additional studies in this field. In fact, they are not safe, because these viruses are easily transmitted to laboratory workers, and the program, I think, will be quite hampered unless Dr. Johnson can have some means of more adequate space which he can utilize to advantage and with safety on some of these new programs.

In my former capacity in the Public Health Service and as a consultant to the World Health Organization, I have traveled extensively in the tropics. I would like to say, Mr. Chairman, that no matter where you go or how remote the location is, whenever you get into a conversation with any medical man he knows about the Gorgas Memorial Laboratory because of the well-deserved worldwide reputation. The new, encouraging prospects which we hope will materialize should enable it not only to continue to hold its place in this respect, but to gain additional stature as time goes on.

Thank you very much, sir.

Mr. SELDEN. Thank you, Doctor, very much.

Mr. Fascell, do you have any questions of any of these gentlemen?

Mr. FASCELL. No questions.

Mr. SELDEN. I want to thank Congressman Roberts, Governor Thatcher, Dr. Bloedorn, and Dr. Wright for coming before the subcommittee today and giving us this information. I am hopeful that we will be able to report this bill for House consideration next week.

Thank you.

Governor THATCHER. You see the importance of getting it at this session.

Mr. ROBERTS. I would like to express to the chairman my deepest appreciation, and to Mr. Fascell, for allowing us to have this time and your kindness in fixing a day for us to come here. I certainly appreciate it, and we, of course, hope for favorable action on the bill.

Mr. SELDEN. Thank you.

Governor THATCHER. We are very grateful.

(Thereupon, at 11:20 a.m., the subcommittee adjourned, to reconvene at the call of the Chair.)

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APPENDIX

GORGAS MEMORIAL INSTITUTE OF
TROPICAL AND PREVENTIVE MEDICINE, INC.,
GORGAS MEMORIAL LABORATORY,
Washington, D.C., August 28, 1959.

Hon. ARMISTEAD I. SELDEN, Jr.,
Chairman, Subcommittee on Inter-American Affairs, Committee on Foreign Affairs, House of Representatives, Washington, D.C.

DEAR MR. SELDEN: We are deeply grateful to you for receiving us so graciously this morning and giving such understanding interest and consideration to our presentation on behalf of the Gorgas Memorial Laboratory in connection with H.R. 8102 as introduced by Congressman Roberts.

As you suggested, I am sending to you herewith a memorandum showing an estimate of the manner in which it is proposed to use the additional funds requested in the bill.

We are proud of what the Gorgas Memorial Laboratory has accomplished and it is our fervent hope to be able to build up and maintain an adequate stable staff of competent research scientists such as will make it possible to realize the full potentialities of the organization.

Again, my thanks for your kindness and courtesy,

Sincerely yours,

WALTER A. BLOEDORN, M.D.

PROPOSED APPLICATION OF ADDITIONAL FUNDS REQUESTED UNDER S. 2219 (H.R. 8102, H.R. 8016) FOR MAINTENANCE AND OPERATION OF THE GORGAS MEMORIAL LABORATORY

Additions to personnel:	
Assistant Scientific Director (GS–14)	$11,355
Virologist (GS–14)	11,355
Parasitologist (GS–13)	9,890
Medical mycologist (GS–12)	8,330
Vertebrate zoologist (GS–11)	7,030
Medical entomologist (GS–12)	8,330
Technicians:	
1 (GS–4)	3,755
1 (GS–3)	3,495
2 (GS–1) ($2,960)	5,920
Laboratory aides: 3 ($1,500)	4,500
Total	73,960
10 percent for social security taxes and retirement	7,390
Total for added personnel	81,350
Travel and other expenses of fieldwork	2,000
Permanent equipment	9,500
Consumable supplies	3,650
Maintenance of laboratory animals	2,000
Transportation of things	1,500
Total	100,000

Gorgas Memorial Laboratory

I. BACKGROUND INFORMATION

The Gorgas Memorial Laboratory was established in 1929 as the operating research agency of the Gorgas Memorial Institute of Tropical and Preventive Medicine, Inc. This was made possible by legislative action of the Congress of the United States and the National Assembly of the Republic of Panama.

A. Legislation

In 1928 a bill was introduced in the Congress to provide for an annual contribution of $50,000 to be made to the Gorgas Memorial Institute, in perpetuity, for the maintenance and operation of a research laboratory on the Isthmus of Panama to be known as the Gorgas Memorial Laboratory. This bill became law on the 7th day of May 1928 (Public Law 350, 70th Cong., 45 Stat. 491).

B. Facilities provided

Following this action by the United States, the Government of Panama, by Law 15 of 1930, ceded in perpetuity as a gift to the Gorgas Memorial Institute a parcel of land and a building which had been constructed thereon originally intended to serve as a medical school. This gift was made with the stipulation that it be used by the Gorgas Memorial Institute for the purpose of conducting investigations in tropical and preventive medicine and that if such operation should be suspended for a period exceeding 5 years the property would revert to the Government of Panama.

1. The plot of land comprises an entire city block in the exposition area of the city of Panama. It has a frontage of 60 meters (196.8 feet), a depth of 75 meters (246 feet), and an area of 4,500 square meters (48,600 square feet). The value of the land originally considered to be $36,750, has increased to an estimated $225,000.

2. The building had been erected for the purpose of housing the offices and lecture rooms of a school of medicine and was intended to serve only administrative, classroom, and similar requirements. It therefore lacked most of the features essential to a laboratory. In January of 1929, when first occupied by the Gorgas Memorial Laboratory, the structure had been completed for 2 years but had never been used. Before actual operations could be started it was necessary to adapt the building to the needs of a laboratory. Water, gas, a sewerage system, electricity and telephone service were installed. Furniture, library, laboratory apparatus, and general supplies had to be assembled. Suitable quarters for animals had to be constructed.

C. Early program

During the period from 1929 to 1948, there was only a small professional staff paid from the funds provided the Laboratory by the United States. Until 1934 there were only two scientists on the staff and from then until 1948 there were never more than five. During these years, however, several U.S. Government agencies, such as the Public Health Service, the Navy, and the Army assigned and supported established investigators at the Laboratory for periods varying from 1 to 15 years. One entomologist from the Public Health Service worked there continuously until 1947, while the Navy sent three investigators whose consecutive tours of duty covered a period of 8 years.

During the period from 1934 to 1948, the projects wholly supported by the Laboratory, with the exception of the malaria studies, were short-term investigations requiring a minimum of outlay for equipment and technical assistance. The high level of scientific achievement was due largely to the fine research ability of the small staff and to the fact that little work had been done in the area so that the investigators were able to make important discoveries relatively quickly. The situation has changed now due in part to the greater complexity of the problems, which necessitates group approach, and in part to the development of more refined (and expensive) research tools.

After World War II, when the members of the professional staff of the Laboratory were returned to civilian status, in order to meet the increased payroll and continue the expanded program set up during the war years, it became necessary to ask the Congress for an increase in the annual contribution made by the United States. This was authorized in 1948 when the original act of May 7, 1928 was amended to authorize an annual contribution of not to exceed $150,000. At that time (1948) the permanent staff of the Laboratory, beginning at four members, was increased to five and then to six. With this larger regular staff, the nature of the research program also changed. It was possible to undertake projects of

longer term and wider range, as illustrated by the DDT-malaria-control studies carried out in cooperation with the Panamanian Government and the yellow fever studies which have been underway since the 1948 outbreak of that disease. With large-scale projects of this sort it became obvious that one of the great needs of the Laboratory was additional professional personnel and supporting technical assistance, not for the purpose of launching additional programs but in order to carry out the few major studies in progress or already planned. Certain extra professionals were secured on a temporary basis with grant funds which have been available for certain periods. One such scientist is engaged on the yellow fever project and three others on leishmaniasis studies.

The tabulation shown below which gives total expenditures and those for personal services reveals the fact that in the last 10 years a major portion, averaging 70 percent, of available funds has been used for personnel. In 1958 and 1959 the budget items for personal services alone exceed the entire congressional appropriations for those years.

As the research program has expanded, it has become necessary to depend more and more on research grant funds from other sources. For 1958 the total contribution of $150,000, which is authorized by law to be paid to the Institute, was appropriated by the Congress but, in addition to that, the Laboratory had to obtain some $82,000 in grant funds elsewhere.

The table below indicates the growth of the Laboratory from 1930 to the present time.

Fiscal years	U.S. contribution	Total expenditures (funds from all sources)	Expenditures for personnel	
			Amount	Percent of total expense
1930–48 average for 19 years	50,000	52,107	32,762	63
1949 (1st year of increased appropriation)	100,000	99,728	59,758	60
1950	100,000	96,540	69,278	72
1951	106,000	112,688	80,836	72
1952	117,600	113,356	82,908	73
1953	117,600	123,276	78,828	64
1954	143,000	138,758	97,919	71
1955	131,000	141,422	97,368	69
1956	147,000	153,869	110,549	72
1957	147,000	154,045	117,200	76
1958	150,000	210,409	146,601	70
1959 estimates	150,000	235,034	169,290	72
1949–59 average for 11 years	128,110	143,556	100,878	70

II. PRESENT STATUS OF THE GORGAS MEMORIAL LABORATORY

A. Program

1. Parasitology

a. Leishmaniasis.—Cutaneous leishmaniasis, related to oriental sore in the Eastern Hemisphere, is a troublesome skin disease characterized by persistent ulcers which finally result in disfiguring scars. It is caused by a protozoan parasite, *Leishmania*, and is one of a group of leishmaniases widely distributed in both hemispheres. It has long been known to occur throughout forested areas from Yucatan to northern Argentina, often with a high infection rate. It was thought to be infrequent in Panama until, beginning in the 1940's, a number of endemic foci were discovered, some with local outbreaks of from 20 to nearly a hundred cases. In 1956 the Laboratory began a long-term study of leishmaniasis in Panama, with the support of a research grant from the U.S. Public Health Service.

There is good reason to believe that Phlebotomus sandflies transmit the parasite from one host to another in the New World although actual transmission has never been demonstrated. Another unsolved problem is the primary source of infection, that is, the reservoir. It is suspected that this is some forest animal, not man. As a background for this project, studies begun in 1943 on the distribution and taxonomy in Panama and elsewhere in the Americas have shown that this group of sandflies, once thought to be rare in Panama with only four known species, is really well represented and often occurs in great abundance in the forests. Over 60 species have been discovered in Panama alone, out of about 200 species known for the New World. A number of the commoner man-biting species, which include the likeliest suspects as vectors of leishmaniasis, are being success-

fully reared in the laboratory for the purpose of carrying out transmission experiments.

Throughout the history of sandfly studies the world over many features of their biology have remained mysteries. For example, natural breeding places have been found only rarely, and for many species their daytime hiding places and their hosts other than man are completely unknown. As an important phase of the leishmaniasis project, field studies along these lines are being vigorously pursued, with some notable initial success. For the first time in this hemisphere there have been found natural breeding places which have yielded larvae in significant numbers. From the soil of such habitats larvae of at least nine species have been recovered and reared to the adult stage.

With regard to the animal reservoir, cultures made from live-trapped animals have turned up one potential reservoir. A forest rodent, the spiny rat, has yielded natural infections in about 10 percent of those trapped in half a dozen endemic areas. In this extensive program other animals (about 24 different genera) have so far been negative but the search is being continued.

It is expected that these leishmaniasis transmission-reservoir studies will throw light on the confused epidemiology of other leishmaniases in various parts of the world.

The pathology of cutaneous leishmaniasis in man is being studied, particularly in connection with the invasion of lymphatic tissue, in the attempt to determine the mechanism whereby the parasite may be harbored for many years with no external symptoms and then reappear in a destructive lesion of the nose and mouth. Several new drugs are being tried in the hope of finding one which is more effective, less toxic, and better adapted to the treatment of scattered rural populations.

b. Chagas' disease.—For about 28 years the Laboratory has studied this important disease but the actual time devoted to it has varied considerably over this period due in part to lack of personnel and in part to the pressure of other research projects. Although a considerable knowledge concerning the disease here in Panama has been accumulated, there is still much to be learned. The most important gaps in our knowledge have to do with the ecology of the vectors, of which there are some nine species of the family *Triatomidae*. The most important of these vectors, *Rhodnius pallescens*, is a wild species and nothing is known of its natural habitat, its host preferences in nature, its seasonal abundance, or of the circumstances which cause it to invade human habitations. Precise, complete information of this nature is necessary before intelligent, effective control of the disease will be possible.

Chagas' disease, like yellow fever and leishmaniasis, is primarily a disease of forest animals and an understanding of their place in the natural cycle of the disease must necessarily form an important part of the control armamentarium.

In the human host, the prevalance of the chronic form of the disease and its importance in the production of chronic heart disease have still to be evaluated and an effective treatment is still to be found.

Present studies include: (1) Ecology of the species of *Triatomidae* which are proven vectors—their breeding and resting places, flight habits, host preferences and seasonal abundance; (2) ecology of the numerous wild animals that serve as reservoirs of the disease; (3) control—no practical method is available at present to control the disease in the forest but the use of residual insecticide sprays in houses and surrounding areas should be tried; (4) pathology of the human disease—our knowledge of the host-parasite relationships is very meager and what information we do possess is limited largely to the acute form of the disease. The parasite can persist for as long as 20 years in some human hosts without causing apparent damage, while in others it produces a crippling chronic cardiac disease with an eventual fatal outcome. This difference in host-parasite states apparently involves differences in pathogenicity, parasite strains, and variability in host resistance and there is need for further study of these phases; (5) continued investigation of possible therapeutic agents is necessary for no such drugs are available at the present time.

c. Malaria.—The experimental project of controlling malaria by residual spraying of insecticides carried out by the Laboratory in Panama since 1944 helped in the development of the continentwide malaria eradication program now being sponsored by the Pan American Sanitary Bureau and the World Health Organization in the Americas. This program is based on two premises: (1) That if all human dwellings of a locality are covered on the inside with a film of an insecticide of residual effect (such as DDT or dieldrin), malaria transmission is completely inhibited in that community for the period of time during which the

insecticide remains effective, said to be 4 to 6 months for DDT and 1 year for dieldrin; (2) that in man the malaria parasite dies out within 3 years after the last infection.

If these two premises are valid, then it is self-evident that if all human dwellings of a community are efficiently covered with a residual insecticide for 4 straight years, malaria will be eradicated from that community.

While the above-mentioned premises are based on sound experimental evidence, it is anticipated that certain epidemiological problems will emerge to cause delays or even to threaten the complete success of the campaign. Some of the more likely problems are: (*a*) Development of physiological or behavioristic resistance by the anopheline vectors to the insecticides being used; (*b*) Outdoor transmission of the disease (this may be going on at the present time although masked by the more abundant infections acquired inside houses); (*c*) The persistence of gametocytes in human carriers capable of infecting the anopheline vector or vectors after the 4-year period when active eradication measures have been discontinued. This point, particularly, deserves further investigation in the field with tests of many strains of malaria parasites and a number of species of anophelines. Present conclusions were derived from work with only a limited number of strains of the parasites and with only a very few species of anophelines.

2. Virology

a. Yellow fever.—The long-term studies of sylvan yellow fever begun in 1949 and pursued through the intervening years are being continued. Much of the past work was conducted in the various countries of Middle America after the appearance of the wave of sylvan yellow fever which was first recognized in Panama late in 1948. From these studies it became evident that new insect vectors were involved and subsequently it was demonstrated that *Haemagogus equinus*, *H. mesodentatus*, and *Sabethes chloropterus* were infected in nature and that these same species could transmit the virus in the laboratory under experimental conditions. Since the beginning of the fiscal year 1957 the work has been concentrated in endemic foci of the disease in Panama where fundamental and still unsolved problems connected with the epidemiology of yellow fever are being studied. The most important of these problems are (1) the manner in which the virus of yellow fever survives the dry season; (2) the importance of the role of mosquitoes other than *Haemagogus* in the transmission of the disease; (3) the role of vertebrates, other than monkeys, as links in the transmission chain in the forests; (4) the factors or conditions which prevent the virus from passing from the endemic areas of eastern Panama into western Panama, an area in which yellow fever is rarely found.

b. Other arthropod-borne virus diseases.—Our yellow fever studies and the work in other laboratories have revealed the presence of other arthropod-transmitted viruses in the forests of Middle America, some of which are the causes of important diseases of man, such as Ilheus, Venezuelan, eastern equine, and St. Louis encephalitis. This whole field needs exploration. There are a number of these viruses suspected to occur in Panama and they need to be looked for specifically in various of the insect groups. Such studies may be expected also to turn up other, as yet undescribed, viruses.

It is planned to pursue work aimed at investigating these viruses and at filling in the gaps in our knowledge of their epidemiology. The work will form part of a long-range program of 5 to 10 years. The development of a program of this magnitude requires enlarging the professional and technical staff by the addition of at least one virologist, a vertebrate zoologist, and several technicians.

The importance of this work to the United States should not be underestimated. Such diseases as eastern equine and St. Louis encephalitis annually causes many deaths and much sickness throughout the United States. It is becoming more and more apparent that these viruses may have as their normal habitat the forests of the American tropics and that they may be introduced into the United States every year by migrating birds or by other means. Therefore a thorough understanding of the ecology of these viruses in the forests of Middle America will be of basic importance in the development of effective methods of control of the diseases produced by them in the United States. All the material (blood specimens and mosquitoes) being used in the study of yellow fever are at present also being investigated for the viruses of the above groups. Up to the present time the Gorgas Memorial Laboratory has identified the viruses of Ilheus encephalitis, eastern equine encephalitis, and a virus which has tentatively been called St. Louis encephalitis. In addition to these specific identifications, six other viral agents are being studied and classified.

3. Entomology

a. Insect vectors of disease.—All the diseases under study at the Gorgas Memorial Laboratory are transmitted by insects. Therefore, knowledge and understanding of the biology of the insects themselves and their relation to the environment is essential for the development of effective control measures. Among the important disease-carrying insects under study are those transmitting leishmaniasis (Phlebotomus sandflies), malaria (anopheline mosquitoes), yellow fever (Haemagogus and Sabethine mosquitoes), Chagas' disease (Triatomas or true bugs) and Rocky Mountain spotted fever (ticks).

b. Colonization studies.—In order to study and secure complete information about the life cycles of these insects they must be colonized in the laboratory. This is necessary also for obtaining the large number of individual insects required for controlled transmission experiments.

c. Insect collections and taxonomy.—The collection, preservation, and taxonomic study of insect forms a necessary part of the overall studies of tropical medicine and is essential in ascertaining their distribution, cycles of abundance, and association with diseases in nature. It must be emphasized that this routine work is part of the basic background necessary for the successful prosecution of any study of insect-transmitted diseases. The constantly increasing mass of information concerning the local fauna and the growing insect collections may be regarded as part of the Laboratory's working capital—not spectacular but absolutely essential.

4. Experimental pathology

It is no longer sufficient just to know what changes are produced by infectious agents or what organs are invaded, altered, or destroyed; it is necessary also to find out how these changes are brought about and why certain organs and tissues are susceptible to invasion and others are not. This can be carried one step further and one may ask why certain animals can harbor the infectious agents without apparently suffering any injury (so-called reservoir hosts) while in others damage may be so severe that death occurs. Even in the individuals of the same species this same type of variation occurs and all degrees of tissue changes are seen.

5. Clinical investigations

Studies of the various manifestations and treatment of the common tropical diseases are a fundamental part of the research program of the Gorgas Memorial Laboratory. These investigations are conducted in cooperation with the hospitals and other medical care facilities in Panama.

6. Animal ecology

This is the study of the biology of the animal in relation to his environment. Such studies are necessary for determining what relationships exist among animals, insect vectors, and man. The Laboratory is collecting and identifying the animal life of Panama with the object of finding out everything possible concerning their distribution and relationship to reservoir potentials for tropical diseases. Without such information it is impossible to devise effective control or eradication measures.

7. Consulting services

The Gorgas Memorial Laboratory gives consulting services to governmental and industrial organizations in the fields of public health, tropical medicine, and pathology. Some 500 specimens (surgical and autopsy) are reviewed each year for such organizations as the United Fruit Co., local medical facilities, and physicians in Panama. This is an excellent source of valuable material and the interesting and rare specimens are forwarded to the Armed Forces Institute of Pathology.

The members of the staff also serve as consultants to governmental health agencies throughout the world. One is a member of the Expert Advisory Panel on Parasitic Diseases of the World Health Organization and is also consultant to the Office of the Surgeon General of the Army and director of the Commission on Hemorrhagic Fever of the Armed Forces Epidemiological Board. The director of the Laboratory is a consultant medical officer in parasitology and tropical diseases to the Health Bureau of the Canal Zone Government. The staff virologist is professor of bacteriology in the Medical School of the University of Panama and other members of the staff are frequent lecturers at the school on subjects relating to tropical and preventive medicine.

An important function of the Laboratory, as a permanent establishment of long standing in the American tropics, is that of providing temporary facilities and the

benefit of the experience and knowledge of its resident staff to visiting investigators. As an example, during fiscal year 1958, assistance of this kind was given to a scientist from the U.S. Museum, to two investigators from the World Health Organization, to a member of the faculty of Swarthmore College, and to a graduate student of the Medical School of Columbia University.

B. Present staffing according to the activities outlined above

	Salary comparable to—
Professional staff:	
1 director and pathologist	GS–15.
1 assistant director and entomologist	GS–13.
2 medical entomologists	GS–12 and 13.
1 virologist and bacteriologist	GS–12.
A microbiologist	GS–10.
1 insect ecologist	GS–7.
1 zoologist (animal ecology)	GS–6.
Technical staff:	
11 medical technicians	GS–1.
2 field technicians	GS–1.
2 technical aides	$1,500.
1 librarian	GS–1.
Other staff:	
6 animal caretakers	$1,500.
2 custodial employees	$1,200.
2 chauffeurs	$1,440.
3 secretary-typists	GS–1.
Temporary employees:	
2 field foremen	$1,440.
9 field helpers	$1,080.

Total, 48.

C. Space and facilities

1. The present laboratory building was put up 35 years ago and was originally designed for a quite different purpose, namely, lecture rooms and offices for a small medical school. The design of the building is such that much of the floor space—over one-third of the total 6,600 square feet in the main building—is not adaptable for laboratory purposes. All available space suitable for laboratories is not only completely filled but there is serious overcrowding. The usable space, excluding the foyer, auditorium and stairways may be summarized as follows:

(*a*) Second floor of the main part of the building: four laboratories of 335 square feet each, one-fourth to one-third taken up by tables, cabinets, desks, and bookcases; current occupants number 10, 5 staff and 5 assistants.

(*b*) Ground floor of main part of building: two laboratories (one without sink) of 335 square feet each; used by technicians (histopathology).

(*c*) Basement: one room of 918 square feet, crowded with equipment, refrigerators, deep freezers; used for virology and culture work in connection with leishmaniasis and trypanosomiasis; occupants number 9, 3 staff and 6 assistants; hall or anteroom of about 615 square feet used for storage, glassware washing, animal handling, autoclaves and ovens—crowded makeshift arrangements.

(*d*) Insectary: about 670 square feet, built in 1955, adequate for the immediate future.

(*e*) Animal quarters: a separate building at the rear of the main building; rebuilt several years ago; needs enlarging and modernizing with the addition of adequate equipment for sterilizing cages, bedding, etc.

The most urgent need for the immediate future is for laboratory space designed specifically for virology and tissue culture with the necessary service rooms, in order to carry through successfully our present programs, and certainly for any expansion of work in the field of virology and the associated work with tissue culture.

Also badly needed is space to accommodate visiting scientists. The use of our facilities has had to be denied to many such workers in the past few years because of lack of working space. With expansion of the physical plant, it will again be possible for the Laboratory to offer this valuable service to scientists of Government agencies who need facilities for pursuing certain phases of their investigations that can only be carried out in the tropics.

In addition to fixed equipment that will be needed in any new laboratory space provided, many items of equipment in use are obsolete or otherwise not adequate and must be replaced, notably the sterilizing facilities. Both for current needs and for necessary expansion of working space, the Laboratory needs additional

mechanical refrigeration equipment for low termpeatures (−65° to −55°), glassware cleaning equipment and other service facilities.

One of the difficulties of working in this area is the lack of adequate library facilities. Although there is a reasonably good medical library in the vicinity, no comparable scientific library exists. More attention must be paid to building up the Laboratory's library and more space must be provided for it.

2. Facilities for animal care.—The present animal care facilities are housed in a one-story structure at the rear of the main building. Originally built shortly after the Laboratory started operation, it contained only 1,296 square feet, of which only half was given over to animal quarters, the remainder being divided equally between storage space and a garage. To this original structure seven large screened outside cages were added (an additional 1,600 square feet) for housing large animals (monkeys, peccary, capybara, sheep and the like) which were required in the experimental programs. In order to meet the needs of the changing and expanding program, alterations have continually been necessary. The present structure encompasses no greater area than the original one (including the outside cages) but modernization and better utilization of space has provided barely adequate facilitie for the present needs.

There are 648 square feet given over to the breeding of and caring for experimental mice; 324 square feet are used for quartering large animals being used in experimental studies; 324 square feet are used for small wild mammals (principally rodents); and 1,972 square feet are still being used for outside cages. The garage and storage space has not been changed. With the ever expanding work on viruses and parasitological diseases there will be need for additional space in the immediate future.

A very real need in the animal breeding and care program is for better facilities for cage washing and sterilizing and adequate means for sterilizing bedding. The cages at the present time are cleaned individually and sterilized with chemical solutions. There should be facilities for steam sterilization. The bedding is used without any treatment.

The rooms given over to colonization and breeding should be air conditioned since the high temperatures and relative humidity interfere with breeding and reduce the size of litters.

3. Insectary.—The insectary, built in 1955, contains 670 square feet and is used for colonization of various types of insects suspected of being vectors and, of equal importance, for conducting transmission experiments. There is one large room of 335 square feet and two smaller rooms of approximately equal size (167.5 square feet each). The largest is used for maintenance and study of the immature, wingless stages of the insects and one of the smaller rooms is used for maintenance and breeding of the adult forms. The third room is used for carrying out transmission experiments and is so constructed and arranged as to prevent the escape of infected animals or insects during the course of the experiments. The entire area is air-conditioned and provided with humidifying equipment so any combination of temperature and humidity can be maintained. The insectary building is adequate for the immediate future. It is anticipated that eventually it will need enlarging to provide facilities for tick, sandfly and other insect cultures. This can be accomplished by adding to the present structure.